

# CLAIMS

What is claimed is:

- 1 1. A method of managing a plurality of data communication connections having  
2 differing data communication rates, comprising:  
3 A) assigning said data communication connections to a plurality of buckets that have  
4 a circular order;  
5 B) establishing a bucket of said plurality of buckets as a current bucket and  
6 establishing another bucket as a fast bucket;  
7 C) establishing a connection assigned to said current bucket as a current connection;  
8 D) communicating data over said current connection;  
9 E) in response to communicating data over said current connection, re-assigning said  
10 current connection to a different bucket of said plurality of buckets based upon  
11 where said current bucket resides in said circular order and a bandwidth  
12 estimation of said current connection;  
13 F) repeating steps (C), (D) and (E) for each connection assigned to said current  
14 bucket;  
15 G) establishing a next bucket as a new current bucket, wherein said next bucket  
16 follows said current bucket in said circular order;  
17 waiting until the earlier of (1) when any connection in the fast bucket is ready for  
18 communication or (2) when a pre-defined period of time elapses; and  
19 repeating step (F) and (G) for each bucket of said plurality of buckets.
- 1 2. The method recited in claim 1, further comprising always placing each newly  
2 established connection in the fast bucket until a pre-determined number of bytes have  
3 been communicated on the newly established connection.

1 3. The method recited in claim 1, further comprising:  
 2 measuring time elapsed in processing connections in a bucket; and  
 3 reducing a rate of establishing the connections when the measured time increases.

1 4. A computer-readable medium carrying one or more sequences of instructions for  
 2 managing a plurality of data communication connections having differing data  
 3 communication rates, wherein execution of the one or more sequences of instructions  
 4 by one or more processors causes the one or more processors to perform the steps of:  
 5 A) assigning said data communication connections to a plurality of buckets that have  
 6 a circular order;  
 7 B) establishing a bucket of said plurality of buckets as a current bucket and  
 8 establishing another bucket as a fast bucket;  
 9 C) establishing a connection assigned to said current bucket as a current connection;  
 10 D) communicating data over said current connection;  
 11 E) in response to communicating data over said current connection, re-assigning said  
 12 current connection to a different bucket of said plurality of buckets based upon  
 13 where said current bucket resides in said circular order and a bandwidth  
 14 estimation of said current connection;  
 15 F) repeating steps (C), (D) and (E) for each connection assigned to said current  
 16 bucket;  
 17 G) establishing a next bucket as a new current bucket, wherein said next bucket  
 18 follows said current bucket in said circular order;  
 19 waiting until the earlier of (1) when any connection in the fast bucket is ready for  
 20 communication or (2) when a pre-defined period of time elapses; and  
 21 H) repeating step (F) and (G) for each bucket of said plurality of buckets.

1 5. The computer readable media recited in claim 4, wherein the steps further comprise  
 2 always placing each newly established connection in the fast bucket until a pre-  
 3 determined number of bytes have been communicated on the newly established  
 4 connection.

1 6. The computer readable media recited in claim 4, wherein the steps further comprise:  
 2 measuring time elapsed in processing connections in a bucket; and  
 3 reducing a rate of establishing the connections when the measured time increases.

1 7. A computer system, comprising:  
 2 a processor; and  
 3 a memory coupled to said processor, said memory comprising one or more sequences  
 4 of instructions for managing a plurality of data communication connections  
 5 having differing data communication rates, wherein execution of the one or  
 6 more sequences of instructions by said processor causes the processor to  
 7 perform the steps of:  
 8 A) assigning said data communication connections to a plurality of buckets that have  
 9 a circular order;  
 10 B) establishing a bucket of said plurality of buckets as a current bucket and  
 11 establishing another bucket as a fast bucket;  
 12 C) establishing a connection assigned to said current bucket as a current connection;  
 13 D) communicating data over said current connection;  
 14 E) in response to communicating data over said current connection, re-assigning said  
 15 current connection to a different bucket of said plurality of buckets based upon

16 where said current bucket resides in said circular order and a bandwidth  
 17 estimation of said current connection;  
 18 F) repeating steps (C), (D) and (E) for each connection assigned to said current  
 19 bucket;  
 20 G) establishing a next bucket as a new current bucket, wherein said next bucket  
 21 follows said current bucket in said circular order;  
 22 waiting until the earlier of (1) when any connection in the fast bucket is ready for  
 23 communication or (2) when a pre-defined period of time elapses; and  
 24 H) repeating step (F) and (G) for each bucket of said plurality of buckets.

1 8. The computer system recited in claim 7, wherein the steps further comprise always  
 2 placing each newly established connection in the fast bucket until a pre-determined  
 3 number of bytes have been communicated on the newly established connection.

1 9. The computer system recited in claim 7, wherein the steps further comprise:  
 2 measuring time elapsed in processing connections in a bucket; and  
 3 reducing a rate of establishing the connections when the measured time increases.